STATE OF CALIFORNIA

AIR RESOURCES BOARD

AIR MONITORING QUALITY ASSURANCE

VOLUME V

STANDARD OPERATING PROCEDURES
FOR
AIR QUALITY MONITORING

APPENDIX T

PERFORMANCE AUDIT PROCEDURES
FOR
TOTAL SUSPENDED PARTICULATE TOXIC METAL LABORATORY AUDITS

MONITORING AND LABORATORY DIVISION

SEPTEMBER 2002

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APPENDIX T.1.0

PERFORMANCE AUDIT PROCEDURES
FOR
TOTAL SUSPENDED PARTICULATE TOXIC METAL LABORATORY AUDITS

MONITORING AND LABORATORY DIVISION

SEPTEMBER 2002

T.1.0 INTRODUCTION

T.l.0.l GENERAL INFORMATION

Audits for toxic metals are conducted at the Inorganics Laboratory Section of the Air Resources Board's (ARB) Monitoring and Laboratory Division (MLD). On an annual basis, ARB purchases standard samples from Inorganic Ventures, Inc. A sample filter set, with accompanying data forms, is sent to the ARB's Quality Assurance Section (QAS) which forwards it to the MLD's Inorganics Laboratory Section for analysis. The laboratory uses graphite furnace atomic absorption spectrometry and follows Standard Operating Procedure (SOP) Number MLD 005, REV. 5.2 for processing and analysis. The sample is analyzed to determine the amount of lead (Pb) in suspended particulate matter. The results are returned to the QAS for calculation of the percent difference.

The purpose of the audit is to assess the accuracy of the laboratory's operating practices and procedure.

T.1.1 AUDIT PROCEDURES

T.1.1.1 INITIATION OF AUDIT

Upon receiving the Inorganic Ventures audit sample filters (see Figure T.1.1.1), the QAS will document receipt of the filters and accompanying data forms. The audit filters will be forwarded to the Inorganics Laboratory Section for analysis.

T.1.1.2 STANDARD OPERATING PROCEDURES

All filters supplied by Inorganic Ventures and audited by the Inorganics Laboratory Section are processed using SOP Number MLD 005, REV. 5.2.

T.1.1.3 COMPLETION OF AUDIT

Upon completion of audit filter processing and analysis, the Inorganics Laboratory Section sends a memo containing raw data and any additional comments or information to the QAS.

Certificate of Analysis

CUSTOM-GRADE FILTER STANDARDS CARB-DISKS

Filter 1A, 1B and 1C Blank
Filter 2A, 2B and 2C 0.24 µg/filter As, 0.12 µg/filter Cd, 2.04 µg/filter Pb
Filter 3A, 3B and 3C 0.76 µg/filter As, 0.24 µg/filter Cd, 7.80 µg/filter Pb

	As	Cd	Pb
Starting Material:	Arsenic Metal	Cadmium Metal	Lead Nitrate
Starting Material Purity:	99+%	99+%	99+%
Starting Material Lot No:	G21F16	K17D07	22150

TRACEABILITY DOCUMENTATION FOR FILTER STANDARD - N-MEB74133

Certified Value:	As	Cd	Pb
Filter 1A	0	0	0
Filter 1B	0	0	0
Filter 1C	0	0	0
Filter 2A	0.241 µg	0.121 µg	2.05 µg
Filter 2B	0.241 µg	0.120 µg	2.05 µg
Filter 2C	0.241 µg	0.121 µg	2.05 µg
Filter 3A	0.763 µg	0.241 µg	7.83 µg
Filter 3B	0.762 µg	0.241 µg	7.82 µg
Filter 3C	0.762 µg	0.241 µg	7.82 µg

The above certified values are based on the starting materials. As is traceable to NIST SRM 3103a. Cd is traceable to NIST SRM 3108. Pb is traceable to NIST SRM 3128.

We use purified acids, 18 megohm double deionized water & meticulously cleaned bottles in the manufacturing of Custom-Grade standards. We always use "in-house calibration checked" Class A Glassware. Our standards are made gravimetrically using balances that are calibrated with registered NJ Weight Sets #NJ89074, NJ89034, NJ90292 and NJ91091. These weights are registered with the NJ Office of Weights and Measures and are traceable through the standards of the State of NJ to NIST (formerly NBS).

Rev.081798

Inorganic Ventures, Inc.
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Technical Support: 800-569-6799

Paul R. Haines
Quality Assurance Manager

Expires:

Figure T.1.1.1
Toxic Metals Audit Certification Report

T.1.2 POST AUDIT CALCULATIONS

T.l.2.l CALCULATION OF PERCENT DIFFERENCE

The QAS shall calculate the percent difference between the Inorganics Laboratory Section's measured results and Inorganic Ventures' assigned results using the following equation (results are recorded in micrograms (ug) / filter):

$$\text{Percent Difference} = \frac{(\text{Measured Concentration} - \text{Assigned Concentration})}{\text{Assigned Concentration}} \times 100$$

T.1.2.2 FINAL AUDIT REPORT

The QAS will forward the Final Results Report Memo (see Figure T.1.2.1) with a cover letter to the Inorganics Laboratory Section. In the event that the percent difference exceeds ±20%, the laboratory will be asked to investigate the cause of the difference. In addition, the QAS will include recommendations for reducing the exceedance.

Winston H. Hickox
Agency Secretary

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
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Gray Davis
Governor

MEMORANDUM

TO: Mike Poore, Chief
Northern Laboratory Branch

THROUGH: Jeff Cook, Chief
Quality Management Branch

FROM: Michael Miguel, Manager
Quality Assurance Section

DATE: August 6, 2001

SUBJECT: SECOND QUARTER 2001 TOXIC METALS LABORATORY AUDIT RESULTS

The Quality Assurance Section (QAS) conducted a laboratory performance audit of the Hi-Vol Total Suspended Particulate (TSP) metals analysis program. The audit materials provided to the Inorganics Laboratory Section (ILS) contained lead (Pb). ILS utilized graphite furnace atomic absorption spectrometry to determine the concentrations of lead present in the audit materials. The results of the audit are as follows (values are in μg/filter):

Sample Number	Compound	Reported Values	Actual Values	Percent Difference
1C	Pb	<LOD	0	---
2C	Pb	2.06	2.05	0.49
3C	Pb	7.74	7.82	-1.02

The percent difference was calculated as follows:

$$\text{Percent Difference} = \frac{\text{Reported Value - Actual Value}}{\text{Actual Value}} \times 100$$

The laboratory's responses were within the targeted ±20 percent limit. Thank you for your participation in this program. In addition to the U.S. EPA's NPAP lead audit, the QAS would like to continue this audit program on a biannual basis. If you have any questions, please call Tim Gergen of my staff at (916) 322-7053.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: http://www.arb.ca.gov.

California Environmental Protection Agency

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Figure T.1.2.1
Final Results Report Memo